

DESCRIPTIONS OF NEW TAXA OF CROTALID SNAKES FROM
CHINA AND CEYLON (SRI LANKA)

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Because the completion of a monographic review of *Agkistrodon* and related genera has been delayed, it seems desirable to publish definitions of four apparently new taxa. A fair sample of the subspecies in the valley of the Yangtze River of China has been available, but the hypodigms of the other three are small. Nevertheless, attention should be called to them in the hope that additional material may become available in the relatively near future. Three are within the polytypic species *Agkistrodon halys* and *Agkistrodon blomhoffii* and the fourth is provisionally considered to be a full species and is assigned to the revived generic name of *Hypnale* Fitzinger (1843).

Selected characters of the new subspecies of *A. halys* and *A. blomhoffii* and the three species of *Hypnale* are summarized in Table 1. Abbreviations for the various museum collections included below are listed in Acknowledgments. Scale reduction formulae follow the recount system of Dowling (1951).

Agkistrodon halys cognatus, new subspecies
Alashan Pit Viper

Agkistrodon halys: Pope 1935:390, 374, 395 (part).

Holotype.—USNM 68586, subadult male, Choni (on Tao River), Kansu Province, China, collected by F. R. Wulsin, 24-31 August 1923.

Paratypes.—USNM 68587-8, Choni, Kansu; USNM 68487, 85 mi N of Lanchow, Kansu; USNM 68503-6, 30 mi ESE of Lanchow; USNM 68541, Lake Koko Nor, Tsinghai, China; all collected by F. R. Wulsin, June-August, 1923.

Description of holotype.—Crown with 9 symmetrically arranged scutes with no aberrations. Internasals wider than long, posterior margins extending obliquely backward to contact with loreals. Prefrontals with pointed tips extending forward mesially to suture between prefrontals. Frontal pentangular with anterior margin truncate and posterior margin bluntly pointed. Supraoculars twice as long as wide. Parietals 1.5 times as long as wide.

Rostral truncate above, height and width equal. Nasals 2 on each side, anterior one only slightly larger than posterior; nostril in suture between

them. Loreals 1 on each side, higher than wide, in contact above with internasals and prefrontals and below with large prefoveals. Preoculars 2 on each side, upper curving forward and upward on the canthus, lower forming the posterodorsal border of pit, not quite extending into orbit. Postoculars 2 on each side, upper small, lower somewhat crescent-shaped and extending around orbit but only slightly beneath eye. Temporals of lowest horizontal row 3 on each side, conspicuously large but becoming smaller posteriorly. Upper temporals in 3-5 oblique rows.

Supralabials 7 on each side, third broadly entering the orbit. Infralabials 10 on each side, anteriormost pair extending to midline posterior to tip of the mental. Chin shields relatively small, only slightly longer than wide. Median gulars in 4 pairs, becoming larger posteriorly. Lateral gulars in 2-5 oblique rows.

Dorsal scales of body and tail with moderate keels, except those of lowest row on each side where no keels are visible. Apical scale pits absent. Scale rows 23-21-19-17, the order of reduction as follows:

$$23 \frac{-5 (13)}{-5 (15)} \quad 21 \frac{-5 (104)}{-5 (107)} \quad 19 \frac{-4 (129)}{-4 (128)} \quad 17 (155).$$

Ventrals 155, anal not divided; subcaudals 49, all divided; terminal spine acutely pointed.

Total length 375 mm; length of tail 57 mm; tail 15.2% of total length.

The general coloration in alcohol consists of various tones of gray and brown. A sharply defined pattern on head; an irregular dark brown bar across the supraoculars and frontal; parietals with broad, crescent-shaped blotches connecting anteriorly with the markings of the frontal and extending backward diagonally onto the upper temporals; internasals and prefrontals with dark edges posteriorly and mesially. On the occiput and neck a roughly triangular figure with its apex on the posterior tips of the parietals, extending laterally above the angle of the jaw and backward on the neck connecting with the main series of blotches of the body. A strong, dark-edged postorbital stripe extends from the lower postocular across the large lower temporals to the angle of the jaw; this is bordered above by a conspicuous light line from the upper postocular backward across parts of two adjacent rows of upper temporals, and below by the light tip of the lower postocular, the lower edge of the first enlarged temporal, and the light color of the last three supralabials. Rostral, muzzle, and anterior supralabials with irregular dark gray stippling. Mental with a light median stripe; infralabials with dark stippling ventrally, leaving light center areas and producing the effect of a scalloped pattern.

Dorsal ground color light gray. A pattern of irregular dark gray cross-bands (probably brown in life) incompletely edged with black, 3-5 scales

wide laterally, and extending down the sides to scale rows three or four; about 40 in number. Crossbands separated by transverse light areas 1 or 2 scales wide. A lateral series of small dark spots on scale rows 1 and 2, in some places overlapping the lateral edges of ventrals. About 15 irregular crossbands on tail; terminal spine brown. Throat and belly cream color, with dark gray or brown stippling, somewhat more dense posteriorly.

The general coloration of the paratypes is essentially similar to that of the holotype.

The seven specimens collected by Wulsin form the basis of the following definition. Scale rows at midbody usually 23 (23-23-17); USNM 68586 (type) and 68588 have only 21 (23-21-17); apical pits absent. Ventrals, 3 males, 153-155 (153.6), 5 females, 156-165 (160.0); subcaudals, 2 males, 48-49 (48.5)¹, 5 females, 36-43 (40.0). Supralabials 7 or 8; infralabials usually 10, occasionally 9 or 11. Preoculars 2, postoculars usually 2, sometimes 3.

Markings of head and body relatively strong; the dorsal blotches or crossbands extend down to scale rows 2-4; in males they number approximately 33-43 (36.5), in females 29-42 (35.3); imprecision in counting is due to their irregular nature; similarly, bands on tail 7-15 in males, 10-12 in females.

Size and form.—The largest male (USNM 68541) measured 590 mm in total length, with an abnormally short tail (11.8%); the largest female (USNM 68504) measured 518 mm in total length. Tail in males 15.2-15.4 (15.3) % of total length, in females 11.6-13.5 (12.7) %.

Range.—China; eastern Tsinghai Province (Lake Koko Nor), southern Kansu (Alashan desert, Choni, Lanchou), and possibly eastward into the province of Shansi.

Although widely separated from them geographically (on the basis of available specimens), this subspecies is related to *A. halys halys* and *A. h. caraganus*. It differs from *halys* in having a considerably lower number of ventrals, a body pattern of irregular narrow crossbands, and a relatively longer tail in males; from *caraganus*, in having a smaller number of larger dorsal blotches and a relatively longer tail.

Agkistrodon blomhoffii siniticus, new subspecies
Yangtze Mamushi²

Ancistrodon blomhoffii: Boulenger 1896:525 (part).

Agkistrodon blomhoffii brevicaudus: Barbour 1912:132, *A. b. brevicaudatus* [sic], pl. 2, fig. 2.

Agkistrodon halys brevicaudus: Stejneger 1925:97 (part).—Schmidt 1927: 541 (part).

Agkistrodon halys: Pope 1932:473; 1934:13, 29 (part); 1935:390 (part).

Holotype.—AMNH 25554, adult male, Ningkwo, Anhwei Province, China; collected by Clifford H. Pope, Central Asiatic Expeditions, September 1921.

Pope (1932) found these snakes abundant in the vicinity of Ningkwo and a relatively large series from there is in the collection of the American Museum and in the Field Museum of Natural History, Chicago. All specimens from the Ningkwo area may be regarded as paratypes.

Definition.—Similar to *A. blomhoffii brevicaudus* but general coloration lighter; spots of the dorsal pattern relatively small and mostly in pairs, 23–38 in number; ventrals 132–148, subcaudals 28–43.

Description of holotype.—No aberrations in 9 scutes of crown. Internasals wider than long, their posterior margins extending obliquely backward to dorsolateral contact with loreals. Rostral slightly wider than high, broadly truncate dorsally and visible from above. Nasals 2 on each side, anterior one slightly larger than posterior, nostril in suture between. Loreals 1 on each side, slightly higher than wide, in contact below with large prefoveals. Preoculars 2 on each side, upper curving above the edge of canthus in front of supraoculars, lower forming the upper posterior border of pit. One postfoveal on each side, forming lower posterior border of pit. Postoculars 2 on left side, 3 on right, lowermost extending beneath eye to dorsal edge of third supralabial which enters orbit back of postfoveal. Orbit surrounded by 6 scales on left side, 7 on right. Pit bordered by a large prefoveal, a small postfoveal, and the lower preocular. Supralabials 7-7, the second of which is smallest, the third largest; infralabials 10-10. Temporals of lowest (first) horizontal row consisting of 3 large, smooth scales decreasing in size posteriorly; temporals of second row 4, anterior largest, of third row 2, all without keels. First infralabials attenuated posteriorly with tips extending backward and in broad contact between the single pair of chin shields. Median gulars in 2 irregular pairs with a small median scale between, and a large suboval scale following the second pair. Lateral gulars in 2–6 diagonal rows.

Dorsal scales of body and tail with keels, except those of lowermost row anteriorly. Paired apical pits present, but small and not easily visible. Scale rows 21-21-19-17, the order of reduction as follows:

$$21 \begin{pmatrix} 6 \\ 6 \end{pmatrix} 21 \begin{pmatrix} -5 & (91) \\ -5 & (86) \end{pmatrix} 19 \begin{pmatrix} -5 & (112) \\ -5 & (113) \end{pmatrix} 17 (141).$$

Ventrals 141, anal not divided; subcaudals 41, all divided; terminal spine with a sharp point.

Total length 570 mm; tail 80 mm; tail 14.0% of total length.

Dorsal pattern of head obscure anteriorly but with paired dark blotches extending backward from crown; muzzle pale brown; postorbital stripe dark brown, bordered above by a distinct light line which is narrowly

edged with black on one row of scales, extending from the upper postocular across the second row of temporals; labials cream to white; an elongate brown blotch on the first four infralabials and lateral gulars adjacent to the chin shields; minute brown stippling on lower jaw anteriorly.

Pattern of body consisting of a series of mostly paired subelliptical blotches or half-bands, 3-5 scales wide, 29 on the left side, 28 on the right; dark brown in color, incompletely edged with black; some alternate and some (7) meet at or near the midline to form irregular crossbands. Dorsal ground color light grayish brown. A secondary series of small, ventrolateral dark spots involving parts of scales of the first dorsal rows and adjacent edges of ventrals. Tail with 8 irregular crossbands becoming obsolete distally, tip pale brown. Belly grayish brown, mottled and flecked with dark brown.

In the Ningkwo region a red or reddish-brown phase is apparently common. Reference to this has been made by Schmidt (1927:541) and by Pope (1935:397). In the series of 24 specimens at hand, 10 are notably pale and probably were reddish brown in life. Although the markings of the sides of the head are distinct, the main pattern and the ventrolateral spots are weak; the belly is almost immaculate. Among the pale ones, 6 are males, 4 are females; among the dark specimens, 8 are males and 6 are females. There is no significant correlation of coloration in reference to scutellation, sex, or size of either adults or subadults.

In addition to the series from Ningkwo, Anhwei Province, I have examined specimens of this subspecies from the provinces of Chekiang, Hunan, Hupeh, Kiangsi, Kiangsu, and Szechwan, a total of 144, on which the following summary of scutellation and coloration is based.

Plates of crown remarkably constant; only a few minor aberrations in parietals. Preoculars 2; postoculars 2 (74%) or 3; orbit bordered by 6 scales (7 when there are 3 postoculars) consisting of 2 preoculars, supraocular, 2 or 3 postoculars, and the 3rd supralabial; a small postfoveal seldom extends to the orbit; 3 large, smooth scales in the lowest row of temporals; second row of temporals smooth, upper rows smooth or with weak keels. Supralabials 7 (95%), occasionally 8, and rarely 6 in juvenile specimens; infralabials usually 10 (71%), occasionally 11 (22%), rarely 9. Ventrals 132-146 (139.1) in males, 134-148 (141.4) in females; subcaudals 33-43 (39.0) in males, 28-37 (33.3) in females, almost always in pairs. In a few specimens (less than 10%) 1-5 undivided subcaudals occur in irregular sequence.

Number of half-bands and/or crossbands on the body 25-37 (30.1) in males, 23-38 (30.9) in females; visible crossbands of tail 3-12 (6.9) in males, 2-12 (6.4) in females, the larger numbers most evident in subadults and young, all becoming less distinct distally.

Size and form.—Examples of this population are relatively small and

slender. The largest male examined measured 665 mm in total length, tail 80 mm; the largest female, 675 mm, tail 67 mm; both are from the Shanghai region, Kiangsu Province. Tail in males 12–16 (13.6) percent of total length, in females, 10–14 (11.5). Total length of 10 juvenile males 190–285 mm, of 3 females 155–203; tail 13–16 (14) % of total in males, 12–13 (12.5) in females.

Range.—The Yangtze Kiang basin from eastern Szechwan Province to the delta region on the East China Sea; northward into Anhwei, Kiangsu, possibly Shantung, and southward to northern Hunan and Kiangsi provinces.

Agkistrodon blomhoffii dubitatus, new subspecies
Tung Ling Mamushi

Agkistrodon halys brevicaudus: Stejneger 1925:97 (part).—Schmidt 1927: 541 (part).

Agkistrodon halys intermedius: Sowerby 1930:23 (part, Tung Ling).

Agkistrodon halys: Pope 1932:471; 1934:13, 29 (part); 1935:391–395 (part).

The hypodigm of this subspecies consists of 5 adults collected in 1917 by A. deC. Sowerby in the Tung Ling region and deposited in the U.S. National Museum and, 12 adults and subadults obtained in the same region by Clifford H. Pope during the Third Asiatic Expedition of the American Museum of Natural History in 1921. The locality for all is recorded as Hsinglungshan [Hsinglung on recent maps], or Eastern Tombs, about 80 mi northeast of Peking.

Stejneger (1925) referred the Sowerby specimens to *A. halys brevicaudus*, Schmidt (1927) similarly classified the American Museum material, and Pope (1934, 1935) combined all of them under *A. halys*.

These specimens seem to represent a population intermediate between *A. b. brevicaudus* and *A. b. siniticus*, not only in their apparently isolated geographical location but also in their characteristics, and in my opinion cannot with assurance be combined with either. Additional material to close the gaps, at least partially, is needed before a satisfactory definition of their relationship can be determined.

Holotype.—AMNH 21498, adult female, Hsinglungshan, Eastern Tombs, Hopei Province, China; collected 7 August 1921 by Clifford H. Pope.

The additional specimens, AMNH 21475, 21496–7, 21499–502, FMNH 7160–4, and USNM 60852–6, may be considered paratypes.

Definition.—Generally similar to *brevicaudus* and *siniticus* but with dorsal blotches widened transversely, extending down sides to scale row 3 or 2, and, when pairs meet in broad contact at midline, tending to form crossbands, especially on posterior half of body; ventrals 138–144, subcaudals 34–44.

Description of holotype.—Plates of crown with no aberrations; inter-

nasals with posterior edges nearly perpendicular to midline; rostral wider than high, upper margin flat; anterior nasals about 1.5 times larger than posterior ones; loreals 1 on each side, slightly wider than high; preoculars 2-2, a small postfoveal in orbit below each lower preocular; postoculars 2-2, upper small, lower crescent-shaped, extending forward under eye, almost excluding 3rd supralabial from orbit; supralabials 7-7, 3rd and 4th large; infralabials 9-9; temporals of lowest row large, smooth, the 1st largest; temporals of 2nd row smaller, also without keels; upper temporals with keels, similar to scales of postparietal region; tip of mental not greatly elongated; tips of first pair of infralabials in narrow contact behind mental; one pair of elongate chin shields; median gulars in 4 transverse rows; lateral gulars in 2-6 oblique rows.

Scale rows 23-21-19-17, order of reduction:

$$23 \frac{-5 (10)}{-5 (6)} \quad 21 \frac{-5 (86)}{-5 (109)} \quad 19 \frac{4+5 (137)}{-4 (127)} \quad 17 (140).$$

All dorsal rows of scales with keels, but keels faint on posterior ends of lowest rows; paired apical pits present, inconspicuous.

Ventrals 140, anal undivided; subcaudals 35, all in pairs except the distal 2.

Total length 525 mm, tail 70 mm, 13.3% of total.

Crown without distinct markings anteriorly; a pair of broad, dark brown stripes extend from supraoculars backward onto neck (not a lyriform figure) to connect on the left side with first crossband; postorbital stripe dark brown, bordered above by a narrow light line beginning on upper preocular and extending through eye across upper postocular and temporals of second row, outlined below by light ventral portions of supralabials 3-7; a vertical dark bar on rostral; mental, first infralabials, and chin shields light with dark brown punctations; 2nd to 4th infralabials with lower edges dark brown, the dark area extending to adjacent scales of chin.

Dorsal pattern of body a series of dark brown half-bands and crossbands, 27 on left side, 25 on right; on the anterior and middle portions of body the half-bands mostly alternate, posteriorly most of them form crossbands fairly regular in shape; all extend down sides to scale row 2; all are darker at the borders, in addition some have narrow light edges dorsally. A series of irregular dark ventrolateral spots on scale rows 1 and 2 and outer edges of ventrals. Belly generally dark, lighter at sides and toward throat; tail with about 6 dark crossbands proximally, tip and terminal spine light.

Variations among paratypes.—In general appearance these specimens do not differ greatly from the holotype. General coloration dark gray or brown with a pattern of dark half-bands and crossbands, narrowly but irregularly edged with dark brown or black. Half-bands 3-5 scales wide on the sides,

extending down to scale rows 3 or 2, meeting in pairs above, or alternating; crossbands, formed by half-bands in broad middorsal contact, occurring on various parts of body but more commonly on posterior half. Number of crossbands and/or half-bands in adults and subadults 27-33 (30.1) in males, 27-35 (29.6) in females; in fetal young of USNM 60856, 29-33 (30.5) in males, 28-35 (31.4) in females. No indication of a red phase (as in *A. b. blomhoffii* and *A. b. siniticus*) is evident.

Markings of the crown are variable and indistinct, especially on the snout. In a few specimens the broad stripes of the parietal and postparietal region somewhat approach a lyriiform figure such as is often noted in *A. b. brevicaudus*. The dark brown postorbital stripe is conspicuous and the light line above it is distinct in all but 3 individuals. There is a ventrolateral series of small more or less distinct dark spots. The belly is generally dark in all except 1 adult and 2 subadults in which the pigmentation is considerably less.

The plates of the crown have no abnormalities. Five specimens differ from the type in having the posterior margins of the internasals curving backward rather than being nearly perpendicular to the midline. Preoculars 2; postoculars 2 (66%), occasionally 3; supralabials 7 (72%), rarely 8; infralabials 9-11, most commonly 10 (64%), occasionally 8, 9, or 11.

Scale rows usually 23-21-17, occasionally 25 or 21 anteriorly, rarely 19 or 16 posteriorly. Ventrals 138-142 (139.8) in males, 138-144 (140.3) in females; subcaudals 35-44 (39.6) in males, 34-38 (36.5) in females. One specimen has 2 undivided subcaudals near the base of the tail, another has 2 near the tip.

Size and form.—The largest male examined (AMNH 21497) is 540 mm in total length; the largest female (AMNH 21499) is 595 mm long with an abnormally short tail (11% of total length). No injury to the tail of this specimen is apparent and a terminal spine is present. In two adult males, the tail is 12 and 16% of total length; in 8 adult females (excluding 21499) the tail varies from 11-14%; in 2 juvenile females, 13%.

Range.—Known only from the region of the type-locality, Hsinglung, in a mountain valley near the northern edge of the North China Plain. This region is separated from the known range of *brevicaudus* by the southern Manchurian Plain and the mountains of Liaoning that extend almost to the sea at Ch'in-huang-tao. From *siniticus* it is separated by the great loess region of Shansi and Honan provinces and the broad, highly cultivated, often flooded valleys of the Huang Ho and the Huai.

Revival of the Genus *Hypnale*

The snakes of southern India and Ceylon hitherto placed in the genus *Agkistrodon* have had a curious nomenclatorial history that need not be de-

Table 1. Summary of selected characters of new Asian subspecies of *Agkistrodon* and the species of *Hypnale* from peninsular India and Sri Lanka. Figures for scale rows and labials represent the mode; other figures represent the range with mean in parentheses.

	Scale rows mid-body	Ventrals	Subcaudals	Supra-labials	Infra-labials	Tail length percent	Bands/spots on body
<i>A. h. cognatus</i>	23	m 153-161 (155.5) f 156-165 (160.3)	m 48-54 (50.3) f 36-43 (40.3)	7	10	m 14.8-15.4 (15.1) f 10.8-13.5 (12.5)	m 33-43 (36.5) f 29-42 (35.3)
<i>A. b. similitus</i>	21	m 132-146 (139.1) f 134-148 (141.4)	m 33-43 (29.0) f 28-37 (33.3)	7	10	m 12.0-16.0 (13.6) f 10.0-14.0 (11.5)	m 25-37 (30.1) f 23-38 (30.1)
<i>A. b. dubitatus</i>	21	m 138-142 (138.9) f 138-144 (140.3)	m 35-44 (39.6) f 34-38 (36.5)	7	10	m 12.0-16.0 (13.9) f 11.6-13.6 (12.2)	m 28-32 (30.0) f 27-32 (29.0)
<i>H. hypnale</i> Merrem	17	m 136-158 (148.0) f 134-156 (146.4)	m 40-48 (43.1) f 32-40 (36.2)	7	8	m 14.3-16.9 (15.7) f 11.3-14.8 (13.0)	m 20-28 (25.0) f 20-33 (25.3)
<i>H. nepa</i> Laurenti	17	m 124-135 (130.6) f 130-142 (134.6)	m 33-41 (37.8) f 33-39 (36.1)	7	8	m 15.4-17.9 (17.1) f 13.0-16.2 (14.3)	m 17-25 (20.0) f 17-26 (22.1)
<i>H. walli</i> n. sp.	17	m 120-124 (122.0) f 122-126 (124.0)	m 33 f 28	7	8	m 14.1 f 11.9-12.7 (12.2)	m 24 f 18-22 (20.1)

tailed here. They are so distinct from all others that separating them under the generic name *Hypnale* Fitzinger (1843) is warranted. Fitzinger designated *hypnale* Schlegel (1837) as the type-species but this name first appeared in Merrem (1820) and is applicable to *hypnale* of modern authors. In addition to *hypnale* Merrem, the group includes *Hypnale nepa* Laurenti (1768; Smith 1937) and a third species described below.

In the course of correspondence with Miss Alice G. C. Grandison about specimens of *Agkistrodon* in the British Museum (Natural History), my attention was called to a manuscript name suggested by the late Dr. Malcolm Smith for two small snakes from Ceylon that he thought different from *A. nepa* as he had defined that species (1937:731). Upon examination of these specimens and others in the collection of the British Museum, together with material from American collections, I found a total of 6 that seem to be significantly different from *H. nepa*. I consider it a privilege to implement Dr. Smith's implied intent to name this hitherto undescribed form in honor of Col. Frank Wall whose many contributions to the herpetology of India and Ceylon during the early decades of this century are well known.

Hypnale walli, new species

Ancistrodon hypnale: Boulenger 1896:528 (part).

Ancistrodon millardi (not of Wall 1908): Wall 1921:554 (part[?]); 1925:249 (part); 1928:39 (part[?]).

Ancistrodon nepa: Smith 1943:500 (part).

Agkistrodon nepa: Deraniyagala 1955:98 (part[?]).

Holotype.—AMNH 99385, female, from Kanneliya Forest, Udugama, Southern Province, Ceylon; elevation approximately 1,000 ft; collected 8 October 1966, by Ranil Senanayake.

Paratypes.—All from Ceylon: BMNH 1937.8.1.1-2, Hakgala, Uva Province (received from Colombo Museum), and the following with no definite localities: BMNH 1894.9.11.38-9 (Sir Charles Layard's collections); CAS 16916, collected by J. C. Thompson in 1908.

Definition and diagnosis.—A small, robust snake with a relatively short tail. Separable from both *hypnale* and *nepa* by fewer ventrals (120-126) and subcaudals (28-33); from *hypnale* by the wartlike cluster of small scales at tip of snout and the presence of hemipenial spines.

Description of holotype.—Tip of snout extended and raised into a distinct papilla composed of 10 minute scales massed behind upward-extending point of the rostral. Internasal and prefrontal region covered by 16 smooth imbricating scales, subcircular to ellipsoid in shape and varying in size. Frontal, supraoculars, and parietals normal, a small extra scale at each anterolateral corner of frontal between frontal and supraoculars. Nasals single, nostrils in center. Loreals large, 1 on each side, extended upward

across canthus, and visible from above. Preoculars 2 on each side, anterior edge of the upper one extended across canthus anterior to the supraocular; lower preocular narrower and forming upper edge of maxillary pit. Postoculars 2 on each side, the upper small, the lower crescent-shaped and extending forward under eye to make contact with the postfoveals. On each side, 3 small scales separate the lower postfoveal from the third supralabial. Maxillary pit bordered above by lower preocular and below by a subfoveal that extends broadly backward into the orbit below the lower preocular; thus the number of scales surrounding the orbit is 6. Supralabials 7-7, infralabials 8-8, the first pair in contact behind the mental.

One pair of chin shields, each only slightly longer than wide. Median gulars in 4 irregular pairs, an extra one on the left side of second pair. Lateral gulars in 2 rows anteriorly and 7 rows opposite the last infralabial. Lowest row of temporals consisting of 4 scales somewhat enlarged, all (save a small one on the left) subequal in size. A diamond-shaped scale on each side between the 4th and 5th supralabials and between the lower postocular and first temporal. Upper temporals in 3-5 irregular rows.

Dorsal scales mostly without keels; rows 2-4 on posterior third of body with broad, low ridges that suggest keels. Apical pits not visible by ordinary inspection but in preparations for the compound microscope paired pits are faintly shown. Scale rows 17 throughout most of the length of the body; reduction formula:

$$19 \frac{-3}{-3} \frac{(11)}{(9)} \quad 17 \frac{-4}{-4} \frac{(106)}{(107)} \quad 15 \quad (126\frac{1}{2}).$$

Ventrals 126, plus a half-sized one on the left just preceding the undivided anal plate. Subcaudals 28, in pairs. Total length 283 mm; tail length 35 mm; tail 12.3% of total length.

Dorsal ground color of head and body brownish olive, sparsely stippled with dark brown. Top of head with small irregular flecks of dark brown; an indistinct transverse bar of dark brown on left supraocular, but only trace of a similar one on the right; a pair of elongate dark spots on parietals; no lyre-shaped figure or other distinct pattern. On sides of head a broad dark brown postorbital stripe, beginning below and behind the eye on the third supralabial and lower postocular and extending diagonally backward over the lower temporals and supralabials, becoming attenuated posteriorly and extending onto the neck; a slightly lighter area above but no sharp line. Rostral and sides of snout brown with dark brown stippling. Ventral side of head pale tan to cream, flecked and stippled with dark brown, and with diffuse brown pigmentation at the tip of the lower jaw and along the infralabials and lateral gulars.

The dorsal pattern of the body is not highly distinct; it consists of a double series of dark brown subtriangular spots, 19 on the left side and 20 on the right, with apices at the midline, some meeting with those of the opposite side and some alternating; spots little darker than ground color but most of them strongly marked by incomplete dark borders at their upper anterior edges. On the tail 3 or 4 pairs of spots followed by a series of markings suggesting narrow crossbands; terminal spine short, blunt, and sharply marked with blackish brown. On the middle row of dorsal scales only a trace of a narrow, dark longitudinal line such as that present on some specimens. A series of small, diffuse ventrolateral spots extends on each side throughout length of body on the lowermost rows of scales; anteriorly they extend over 2 or 3 adjacent scales and in the neck region they are set off by a somewhat lighter stripelike area above; posteriorly they tend to be restricted to single scales. Throat and belly tawny cream, stippled and flecked with brown; underside of tail lighter at tip.

Some specimens have markings more conspicuous than those of the type. BMNH 94.9.11.38 has a pair of dark brown blotches on the sides of the head posterior to the supraoculars, and a pair of dark stripes curving backward on the sides of the neck; there is a dark median figure extending backward from the frontal, expanding in the occipital region and tapering on the neck; this is followed by a narrow middorsal brown line that extends almost throughout the length of the body. The main pattern consists of paired subtriangular blotches, opposite or alternating, and not meeting at the midline. There is a less distinct series of ventrolateral spots on each side. The belly is strongly flecked and dappled with grayish brown. BMNH 94.9.11.39 is similar but with markings lighter in tone.

In the 6 specimens, the range in number of dorsal blotches is 18–24 pairs on the body, 3–8 on the tail. The following summary is based on the total of 6.

Tip of snout recurved and with a papilla of 10–15 very small scales just back of rostral, and 14–21 small, irregular scales in internasal and prefrontal region. Preoculars 2 (75%) or 3; postoculars 2 (75%) or 3; supralabials 7 (83%) or 8; infralabials 8. Scale rows 19–17–15 (a minimum of 13 in one specimen), keels faint on lateral rows posteriorly, or absent; paired apical pits visible with magnification. Ventrals, 2 males, 120–124 (122.0); 4 females, 122–126 (124.0); subcaudals divided, 1 male, 33; 4 females, 28 in each.

Size and form.—These snakes are relatively small, stout-bodied and short-tailed. The largest male measured 305 mm in total length, tail 43 mm (14%); 4 females ranged from 235–283 mm in total length, tail 11.9–12.7 (12.3)%.

Range.—Known only from Ceylon.

The locality in which Senanayake collected the holotype, the Udugama

specimen, has been described as a very damp area of the Kanneliya primary rain forest in the foothills of the Sabaragamuwa range of mountains where the annual rainfall is 180–200 inches (Grandison and Senanayake, 1966, p. 421).

If the locality of the Colombo Museum specimen (Hakgala, where Wall found *nepa* to be abundant) is acceptable, *walli* occurs both in the hills and in the low country of the Southern Province. The possibility of localized ecological factors that might separate *walli* and *nepa* remains to be explored.

In *The Snakes of Ceylon* (1921:xiii) Frank Wall wrote: "From available records many of the hill species appear to be very local, apart from inhabiting a restricted belt of elevation. I think it extremely probable that many more hill snakes remain to be discovered in peaks and ranges that have up to now escaped exploration." Perhaps, even after more than fifty years, such a statement may still be true.

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Footnotes

¹ One male, USNM 68541, here omitted, has what seems to be an abnormally short tail (34 caudals) but a terminal spine is present.

² The Japanese word “mamushi” is suitably applicable to all subspecies of *Agkistrodon blomhoffii*.